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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/783,792 | 02/15/2001 | Raj Mani Misra | 1-2-156.2US | 3039 |

24374 7590 01/10/2005

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| EXAMINER | |
|---|---|
| MEW, KEVIN D | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2664 | |

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|---|---|---|
| | 09/783,792 | MISRA ET AL. |
| | Examiner | Art Unit |
| | Kevin Mew | 2664 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *23 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *5,6 and 9-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *18-19, 22-23* is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *8/23/2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

***Detailed Action***

***Response to Amendment***

*1.* Applicant's arguments/remarks filed on August 23, 2004 regarding claims 5-6, 9-13, 18-19, 22-23 have been fully considered and are currently pending. Claims 1-4, 7-8, 14-17, 20-21 have been canceled by the Applicant.

2. Acknowledgement is made of the amended drawings filed on August 23, 2004 regarding the objection to the deficiency cited in the drawings of the previous Office Action. The objection to the drawings is now withdrawn.

3. Acknowledgement is made of the amended specification filed on August 23, 2004 regarding the objection to the deficiency cited in the drawings of the previous Office Action. The objection to the drawings is now withdrawn.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 5-6, 9-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art, Laakso et al. (USP 5,933,423) in view of Richardson (USP 6,032,052).

Regarding claim 5, Laakso discloses a method for use in a receiver for receiving a plurality of data signals transmitted over a shared spectrum (**all the terminal equipment transmit at the same frequency to the base station**, see lines 39-43, col. 3) in a time slot in a time division (**received signals are divided into several groups such that the signals in each group are detected from the received transmission simultaneously**, see lines 60-63, col. 2) duplex communication system (**signals transmitted and received at both mobile stations and base stations**, see Fig. 1) using code division multiple access (**CDMA cellular radio network**, see line 35, col. 3), the method comprising:

receiving a combined signal over the shared spectrum in the time slot (**all the terminal equipment transmits at the same frequency to the base station, which distinguishes the transmissions of the different terminal equipment from one another on the basis of the spreading codes of the terminal equipment**, see lines 42-46, col. 3);

estimating a received power level for each data signal (**each group comprises signals received at approximately the same power**, see lines 63-65, col. 3);

selectively grouping data signals of the plurality of data signals based on in part the received power level of the data signals into at least one group (**the signals are divided into groups on the basis of preliminary power measurement of the received signal**, see lines 59-65, col. 3); and

separately detecting data within each group for that group's data signals (**within a group, the signals are detected from the received transmission simultaneously by a detection algorithm provided by simultaneous multiuser detection**, see lines 55-58, col. 3).

Laakso does not explicitly show the estimating the received power level for each data signal is based on in part a power level of a training sequence associated with each data signal.

However, Richardson discloses a radio telephone network that provides a method for transmitting control data between a transmission means and a receiving means, comprising varying a predetermined output power level from the transmission means in accordance with a sequence of power levels indicative of a control message (see col. 2, lines 60-65). Richardson further discloses a receiver for measuring received power by measuring the received signal strength based on the steady signal power level received during the training sequence (see col. 5, lines 65-67 and col. 6, lines 1-12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the CDMA receiver of Laakso with the teaching of Richardson in estimating the received power of an incoming signal such that the received power is measured by measuring the received signal strength based on the steady signal power level received during the training sequence. The motivation to do so is to for the CDMA receiver to equalize an incoming signal in such a way that it reduces the rapid variations in the output power level

thereby avoiding frequency noise or spectral spreading of the signal and consequently less interference with other communication channels.

Regarding claim 6, Laakso discloses a method for use in a receiver for receiving a plurality of data signals transmitted over a shared spectrum (**all the terminal equipment transmit at the same frequency to the base station**, see lines 39-43, col. 3) in a time slot in a time division (**received signals are divided into several groups such that the signals in each group are detected from the received transmission simultaneously**, see lines 60-63, col. 2) duplex communication system (**signals transmitted and received at both mobile stations and base stations**, see Fig. 1) using code division multiple access (**CDMA cellular radio network**, see line 35, col. 3), the method comprising:

receiving a combined signal over the shared spectrum in the time slot (**all the terminal equipment transmits at the same frequency to the base station, which distinguishes the transmissions of the different terminal equipment from one another on the basis of the spreading codes of the terminal equipment**, see lines 42-46, col. 3);

estimating a received power level for each data signal (**each group comprises signals received at approximately the same power**, see lines 63-65, col. 3);

selectively grouping data signals of the plurality of data signals based on in part the received power level of the data signals into at least one group (**the signals are divided into groups on the basis of preliminary power measurement of the received signal**, see lines 59-65, col. 3); and

separately detecting data within each group for that group's data signals (**within a group, the signals are detected from the received transmission simultaneously by a detection algorithm provided by simultaneous multiuser detection**, see lines 55-58, col. 3).

Laakso does not explicitly show the estimating the received power level for each data signal is based on in part aprior knowledge at the receiver.

However, Richardson discloses a radio telephone network that provides a method for transmitting control data between a transmission means and a receiving means, comprising varying a predetermined output power level from the transmission means in accordance with a sequence of power levels indicative of a control message (see col. 2, lines 60-65). Richardson further discloses the different power levels in a sequence and a set of power levels for a radio telephone can be defined (see col. 5, lines 65-67 and col. 6, lines 1-12).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the CDMA receiver of Laakso with the teaching of Richardson in estimating the received power of an incoming signal such that the received power is measured by measuring the received signal strength based on the predefined power levels in a training sequence and in a set of power levels for a radio telephone. The motivation to do so is to for the CDMA receiver to equalize an incoming signal in such a way that there is little variation in power level during a sequence or between sequences of a set of power levels by pre-bias the equalization.

Regarding claim 9, Laakso discloses the method of claim 5 wherein the

selectively grouping data signals groups data signals within a certain threshold power level into a group (see lines 59-65, col. 3).

Regarding claim 10, Laakso and Richardson discloses all the aspects of the claimed invention set forth in the rejection of claim 9 above. Laakso does not explicitly disclose the method of claim 9 wherein the certain threshold power level is one decibel.

However, Richardson discloses the predetermined output power level in the sequence of power levels has a step size of 1 dB (see col. 3, lines 49-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the CDMA receiver of Laakso with the teaching of Richardson in estimating the received power of an incoming signal such that the received power is measured by measuring the received signal strength based on the predefined power levels in a training sequence and in a set of power levels for a radio telephone. The motivation to do so is to inhibit frequency spreading and noise interference with other channels because a larger number of different sequences will be devised when a smaller step size for the power levels of the training sequence is employed.

Regarding claim 11, Laakso discloses a method for use in a receiver for receiving a plurality of data signals transmitted over a shared spectrum (**all the terminal equipment transmit at the same frequency to the base station**, see lines 39-43, col. 3) in a time slot in a time division (**received signals are divided into several groups such that the signals in each group are detected from the received transmission simultaneously**, see lines 60-63, col. 2) duplex communication system (**signals transmitted and received at both mobile stations and**

**base stations**, see Fig. 1) using code division multiple access (**CDMA cellular radio network**, see line 35, col. 3), the method comprising:

receiving a combined signal over the shared spectrum in the time slot (**all the terminal equipment transmits at the same frequency to the base station, which distinguishes the transmissions of the different terminal equipment from one another on the basis of the spreading codes of the terminal equipment**, see lines 42-46, col. 3);

estimating a received power level for each data signal (**each group comprises signals received at approximately the same power**, see lines 63-65, col. 3);

selectively grouping data signals of the plurality of data signals based on in part the received power level of the data signals into at least one group (**the signals are divided into groups on the basis of preliminary power measurement of the received signal**, see lines 59-65, col. 3); and

separately detecting data within each group for that group's data signals (**within a group, the signals are detected from the received transmission simultaneously by a detection algorithm provided by simultaneous multiuser detection**, see lines 55-58, col. 3).

Laakso does not explicitly show the certain threshold is adjusted to achieve a desired bit error rate at the receiver.

However, Richardson Richardson discloses a radio telephone network that provides a method for transmitting control data between a transmission means and a receiving means, where data is divided into groups prior to transmission and the respective groups are transmitted at the respective power levels in accordance with the sequence of power levels (see col. 3, lines 27-31) in a such way that the respective power levels in each group have little variations in the output

power level. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the CDMA receiver of Laakso with the teaching of Richardson in achieving little variations in the output power level. The motivation to do so is to make the changes in the power level smoothly so that there is less noise generated by frequency spreading and consequently less interference with other communication channels.

Regarding claim 12, Laakso discloses all the aspects of the claimed invention set forth in the rejection of claim 5 above, except fails to explicitly show the method of claim 5 further comprising forcing all of the data signals into a single group to override the step of selectively grouping. However, it is well known in the art teaching that as the number of groups is decreased to just one, the signal interference cancellation required in the detector means is decreased as well. As a result, the performance of the detector block will improve as signal interference cancellation has been reduced. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the multiuser signal detection method and receiving means of Laakso such that all of the data signals would be grouped into just one single group to override the step of selective grouping. The motivation to do so is to reduce the interference cancellation required in the detection process to a minimum possible because the signal to noise ratio performance will increase in the absence of excessive interference cancellation.

Regarding claim 13, Laakso discloses all the aspects of the claimed

invention set forth in the rejection of claim 5 above, except fails to explicitly show the method of claim 5 further comprising forcibly grouping each data signal into its own group to override the step of selectively grouping. However, Laasko teaches that calculations needed in the detection of the received transmission are reduced significantly if the number of groups of signals is increased (see the exemplary calculations shown in lines 12-18, col. 5). Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the multiuser signal detection method and receiving means of Laakso such that each data signal would be grouped into its own group to override the step of selective grouping. The motivation to do so is to increase the number of groups to a maximum possible so that the calculations needed in the detection of the received transmission will be reduced significantly because having less complex circuit to perform calculations would reduce the complexity of the receiver.

***Allowable Subject Matter***

5. Claims 18-19, 22-23 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

In claim 18, the receiver comprising:

a first matched filter for processing the baseband signal to match symbol responses of the data signals in the first group; and

a second matched filter for processing the subtracted signal to match symbol responses of the data signals in the second group; and

wherein an output of the first and second joint detection blocks are soft symbols, the device further comprising a first and second soft to hard decision block converting the first and second joint detection block outputs into hard symbols.

In claim 22, the device comprising:

a first matched filter for processing the baseband signal to match symbol responses of the data signals in the first group; and

a second matched filter for processing the subtracted signal to match symbol responses of the data signals in the second group; and

wherein an output of the first and second joint detection blocks are soft symbols, the device further comprising a first and second soft to hard decision block converting the first and second joint detection block outputs into hard symbols.

***Response to Arguments***

6. Applicant's arguments with respect to claims 5-6, 9-13, 18-19, 22-23 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent 6,009,334 to Grubeck et al.

US Patent 5,854,784 to Solve et al.

US Patent 5,835,541 to Namekata et al.

US Patent 5,673,288 to Okanoue

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Mew whose telephone number is 571-272-3141. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wellington Chin can be reached on 571-272-3134. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KDM
Art Unit 2664